

CLAIMS

1. A method for determining the absolute angular position \ of the steering wheel (1) of a motor vehicle with respect to the chassis of said vehicle, by means of a system including:
- a device for incremental measurement of the relative angular position TM of the steering wheel, including:
 - o an encoder (5) intended to be set in rotation together with the steering wheel (1), said encoder including a main multipolar track;
 - o a fixed sensor (6) arranged with respect to and at a gap distance from the encoder (5), including at least two sensitive elements positioned with respect to the main track so as to deliver two periodic electrical signals S1, S2, in quadrature, the sensor (6) including a suitable electronic circuit (7), so as to deliver the relative angular position TM of the steering wheel (1) based on the signals S1, S2;
 - a device (2) for measuring the differential speed $\otimes V/V$ of the wheels on the same axle;
 - a processing device (8) that is able to sample, in a period t, the angular positions TM(t_i) and the differential speeds $\otimes V/V(t_i)$, said device including calculation means suitable, at every t_n instant, for:

- o determining an estimate $\hat{\theta}(t_n)$ of the absolute angular position $\theta(t_n)$ according to the differential speed $\otimes V/V(t_n)$;
 - o determining the average offset (t_n) difference between the angular positions $\hat{\theta}(t_i)$ and $\theta^M(t_i)$, where i varies from 0 to n ;
 - o determining the absolute angular position $\theta(t_n)$ by adding the average offset (t_n) difference and the angular position $\theta^M(t_n)$.
- 10 2. A system according to claim 1, characterised in that the multipolar track is formed by a multipolar ring on which multiple pairs of north and south poles are magnetised and evenly distributed with a constant angular width.
- 15 3. A system according to claim 1 or 2, characterised in that the electronic circuit (7) includes an interpolator that allows the output signal resolution to be increased.
- 20 4. A method for determining the angular position θ by means of a system according to any one of the claims from 1 to 3, said method including repeated steps that contemplate:
- measuring the angular position $\theta^M(t_i)$ and the differential speed $\otimes V/V(t_i)$;
 - 25 - determining an estimate $\hat{\theta}(t_n)$ of the absolute angular position $\theta(t_n)$ according to the differential speed $\otimes V/V(t_n)$;

- determining the difference in the average of the vectors $\hat{\theta}^*(t_n) = [\theta^*(t_0), \dots, \theta^*(t_n)]$ and $\hat{\delta}(t_n) = [\delta^{TM}(t_0), \dots, \delta^{TM}(t_n)]$ so as to obtain the average offset(t_n) difference;
- 5 - determining the absolute angular position $\theta(t_n)$ by adding the average offset(t_n) difference and the angular position $\theta^{TM}(t_n)$.
5. A method according to claim 4, characterised in that the measurement of the differential speed $\Delta V/V(t_i)$ is
- 10 taken on the non-drive wheels.
6. A method according to claim 4 or 5, characterised in that it is implemented under set driving conditions.
7. A method according to claim 6, characterised in that the driving conditions include a maximum rotation
- 15 speed of the steering wheel and/or a minimum speed of the vehicle.